

II. REMARKS

A. Introductory Remarks

Reconsideration of this application is earnestly requested. Claims 2-8, 11-12, 14, 15 and 22, 25-28 are pending in this application. Independent claim 14 is canceled. Claims 2-3, 5-8, 11-12, 15, 22 and 25 are amended for clarity. No new matter has been added by these amendments.

B. Substance of Telephonic Interview

Applicants thank Examiner Kin-Chan Chen for courtesies extended during the telephonic interview and discussions held on April 17, 2008. The following is Applicant's statement of the substance of those discussions.

Applicants discussed with the Examiner the nature of the rejections over Ueda and Wieserman in the non-final Office Action mailed on January 03, 2008. In particular, Applicants submitted that in contrast to the recitation of claim 15, Ueda and Wieserman in combination did not teach or suggest a plurality of chelator compounds that lacked a phosphorous containing group. Applicants further submitted that a phosphorous containing group was essential in Wieserman's "active compound", and, therefore, claim 15 was clearly distinguishable over Wieserman. Applicants agreed to cancel independent claim 14 without prejudice or disclaimer of the encompassed subject matter.

In response, the Examiner noted that Applicants had previously deleted all "phosphorous containing groups" appearing in the claims filed in the amendment on October 18, 2007. Additionally, the Examiner suggested that Applicants argue the novelty and unobviousness of the feature of claim 15, "wherein at least a portion of the functional groups are no further than about 7Å from another functional group." Applicants indicated that the current response would address this issue. No agreement was reached during this telephonic interview.

C. Rejection of Claims 22, 2-7, 11, 12, 14, and 25-28 Under 35 U.S.C. §112, First and Second Paragraph

The Office Action rejected claim 22 under 35 U.S.C. §112, second paragraph, as allegedly being indefinite. Specifically, the Office Action asserted that the feature, “the chelators” lacked sufficient antecedent basis. *See*, Office Action at p. 3

Without acquiescing to the merits of this rejection, Applicants have amended independent claim 22 by reciting “the chelator compounds”, which has antecedent basis in independent claim 15. Accordingly, Applicants submit that amended claim 22 is definite and respectfully request withdrawal of this rejection.

Further, the Office Action rejected claims 2-7, 11, 12, 14, and 25-28 under 35 U.S.C. §112, first paragraph, as allegedly failing to comply with the written description requirement. In particular, the Office Action asserted that the recitation “chelator compounds do not include phosphorous groups” is new matter because it is not explicitly supported in the specification.

Without acquiescing to the merits of this rejection, Applicants have canceled independent claim 14 without prejudice or disclaimer of the encompassed subject matter. Claims 2-7, 11, 12, and 25-28 have been made dependent upon independent claim 15. Accordingly, Applicants respectfully request withdrawal of this rejection.

D. Rejection of Claim 15 Under 35 U.S.C. §103

The Office Action rejected claim 15 as allegedly being obvious over U.S. Patent Application No. 2003/0017785 (“Ueda”) in view of U.S. Patent No. 4,904,634 (“Wieserman”). More specifically, the Office Action admits that Ueda does not disclose “that the chelating compounds may be attached to the spacer, which is different than the chelating compounds and different than the particle.” *See*, Office Action at p. 4. The Office Action, however, asserts that it would have been obvious to use the spacer as disclosed by Wieserman in the composition of Ueda because Wieserman teaches that it may be used as a spacer and for metal chelating agent application. *See* Office Action p. 4. Further, the Office action states that “since same type of

material is used (*e.g.*, the spacer may be an organic molecule comprising a monomer or oligomer, it would have been obvious to one with ordinary skill in the art that it would have the same function and effect (such as “a spacer”, attached by a covalent bond to the chelator compound) as instantly claimed.” *See*, Office Action at p. 4. Applicants respectfully traverse this rejection.

1. Combination of Ueda and Wieserman does not teach all elements of claim 15.

Contrary to the assertion in the Office Action, Applicants respectfully submit that the combination of Ueda and Wieserman does not teach or suggest all elements of previously amended claim 15.

Ueda teaches a polishing composition comprising a chelate resin particle and an inorganic particle, wherein the chelate resin particle carries on the surface thereof a polydentate ligand having a plurality of coordinated atoms forming a complex with a metal. *See*, Ueda, paragraphs [0008] and [0012]. The chelate resin slurry is prepared by dry grinding and hammer milling a commercially available chelate resin having an iminodiacetate group obtained from Sumitomo Chemical Co. *See* Ueda paragraph [0060]. It is important to note that the iminodiacetate functional group on the surface of the chelate resin particle is generated due to grinding of the resin thereby exposing the iminodiacetate functional groups and is not added thereon by chemical methods. *See*, Ueda paragraph [0060] and paragraph [0012]. In contrast, claim 15 does not recite any chelate resin particle. Additionally, claim 15 recites a plurality of chelator compounds attached through spacers that are different from the particles and the chelator compounds.

Wieserman addresses the problem of improved metal oxide adsorbents by surface bonding with a monolayer of one or more phosphorous containing organic materials. *See*, Wieserman at col. 2 ll. 30-34. As shown in figure 8 of Wieserman, the organic material forms a monolayer on the surface of the metal oxide particles. The depicted phosphorous head is attached by a covalent bond to the metal oxide particle, whereas the polymer tail is free and is not attached to another metal oxide particle or chelator compounds. Wieserman does not teach

that his “active material” be used as a spacer to hold a particle body and chelator compounds apart. Rather, Wieserman defines an “active material” as follows:

“active material” is intended to define an organic molecule comprising a monomer, oligomer, or short chain polymer having a phosphorus-containing group, and preferably at the end of the molecule, capable of bonding to the metal oxide/hydroxide support and having one or more sites thereon, preferably at the opposite end of the molecule, which may be used for the coupling, bonding, or adsorbing, etc. of atoms, ions or other molecules thereto, e.g., when the active material functions as an adsorbent, the active material will have sites available on the molecule to which the material to be adsorbed will be attracted. *See*, Wieserman col. 4, lines 37-48.

From reading this definition of an active material, it would be clear to one of skill in the art that Wieserman teaches an active material comprising a phosphorus-containing group with a short chain polymer having sites at the end to adsorb atoms. Wieserman is limited to the use of phosphorus-containing organic materials for bonding to a metal oxide surface, presumably given the observed superior adsorbent properties of the product. In contrast to Wieserman, the chelator compounds recited in Applicants’ claim 15 do not include phosphorus-containing functional groups such as phosphonic acid. The current claim 15 was previously amended by deleting “phosphonic acids” and “phosphonates” from the list of recited chelator compounds in the amendment filed on October 18, 2007. Thus, the combination of Ueda and Wieserman does not teach or suggest a plurality of chelator compounds that lacks phosphorus containing functional groups for use as a spacer to hold metal oxide particles and a plurality of chelator compounds apart.

Additionally, the combination of Wieserman and Ueda does not teach or suggest the claimed recitation, “wherein at least a portion of the functional groups are no further than about 7 Å from another functional group.” Neither Wieserman nor Ueda teaches the distances between chelating functional groups on the chelator compounds. Therefore, as indicated by the foregoing, Applicants consider independent claim 15 to define subject matter that is novel and unobvious over Ueda and Wieserman either alone or in combination.

Further, with respect to claim 15, the Office Action asserts that claim 15 specifies that at least a portion of the functional groups is no further than about 7 Angstroms from another

functional group. See Office Action, p.5. Further, the Office Action asserts that since the compound is used as a chelating agent, it is expected that the distance between the two functional groups are adjusted so as to efficiently chelate the metallic residues depending on the product requirement, therefore, it is merely a matter of choice of design depending on the product requirement." *Id.* Applicants respectfully traverse these arguments for the following reasons.

Applicants submit that the recited distance of no further than about 7 Å from another functional group in the chelator compounds could not be the outcome of choice of design depending upon the product requirement because this design provides sufficient proximity to allow efficient chelation of ions (e.g. metal ions, metal-containing ions) during polishing. Such choice of distance of one functional group that is no further than about 7 Å from another functional group is a unique choice of design for the invention of claim 15 in part because any distance closer or farther away than 7 Å may be possible, but in this case this distance of 7 Å or less provides the optimal results. For example, paragraph [0033] of the specification recites:

Chelating compounds (hereinafter "chelators," for convenience purposes only and without any intent to limit) are known to those in the art and generally include compounds that have multiple (i.e., at least two) polar functional groups present on the molecule *in sufficient proximity to allow chelation of ions* (e.g., metal ions, metal-containing ions, or the like, or combinations thereof) abraded, dissociated, etched, and/or removed from the surface of a substrate being polished. Practical limitations on the sufficient proximity of the multiple polar functional groups can depend upon the size (e.g., atomic radius, radius of gyration, etc.), chemical nature (e.g., composition, atomic bonding structure, etc.), valence, and other properties of the ions, as well as upon the polarity, polarizability, electrophilicity, acidity/basicity, and other properties of the chelators and/or any diluent/solvent present. In one embodiment, the polar functional groups can be no further than about four atomic bond lengths from each other, preferably no further than about three atomic bond lengths from each other. In another embodiment, *the polar functional groups can be no further than about 7 Å*. See, paragraph [0033] of the specification. [Emphasis supplied].

Based on the above, routine experimentation could not be used to optimize the chelating efficiency because the prior art references of Ueda and Wieserman are silent about the chelator compounds having functional groups that is no further than about 7 Å from another functional

group. Applicants respectfully submit that claim 15 specifically defines a unique parameter of the spatial distance between functional groups that is not taught or suggested by the prior art. Wieserman, for example teaches the phosphonic acid $\text{RPO}(\text{OH})_2$ and phosphinic acid $\text{RR}'\text{PO}(\text{OH})$ where R and R' may each be comprised of 1-30, preferably 5-20 carbon containing groups such as an alkyl group. See, Wieserman, col. 6, ll. 48-55. One of ordinary skill in the art would deduce that the distance between the functional groups $\text{P}(\text{O})\text{OH}$ in Wieserman could vary widely as a result of the variation of the R and R' distances of the chelating groups. Applicants submit that the distance between his phosphonic and phosphinic functional groups of the active compound could vary anywhere from 1 to 30 carbon atomic lengths (which translates to about 1.54 to 46.2 Å, assuming a C-C bond length of 1.54 Å). Accordingly, Applicants submit that a distance no further than about 7 Å from another functional group in the chelator compounds is not a product of common knowledge or a well known feature in the field because Wieserman, for example, does not teach such a specific range of distance between functional groups. Absent a showing that the feature of a distance no further than about 7 Å from another functional group in the chelator compounds is well known in the art, the subject matter of claim 15 cannot be held obvious.

Applicants further submit that the fact that a claimed product is within a broad field of prior art and one might arrive at it by selecting specific items and conditions, does not render the product obvious in the absence of some directions or reasons in the prior art for making such selections. (Ex Parte Kuhn, 132 U.S.P.Q. 359 (1961)). Prior art references in combination do not make an invention obvious unless something in the prior art references would suggest the advantage to be derived from their combined teachings. In re Sernaker, 217 U.S.P.Q. 1, 6 (Fed. Cir. 1983). Applicants respectfully submit that claim 15 specifically defines a distance no further than about 7 Å from another functional group in the chelator compounds, which is not taught or suggested by the prior art. Accordingly, Applicants request withdrawal of the rejection as to claims 6 and 15.

In view of the above reasoning, Applicants respectfully submit that the same conclusion applies to claims 2-8, 11-12, 22, 25-28 as these claims depend from independent amended claim 15, which as discussed above is believed to be allowable.

E. Rejection of Claim 22 Under 35 U.S.C. §103

The Office Action rejected claim 22 as allegedly obvious over Ueda in view of Wieserman, and further in view of U.S. Patent No. 4,732,887 ("Obanawa"). Specifically, the Office Action asserted that it would have been obvious to one with ordinary skill in the art to modify the combined Ueda and Wieserman teachings by using the composite chelating particles as taught by Obanawa in order to efficiently chelate (or adsorb) the metallic residues. See Office Action on pp. 5-6. Moreover, the Office Action asserts that dependent claim 22 differs from the combined prior art by specifying well-known features (such as chelating compound having at least three sulfonic acid groups) to the art of polishing and wet etching, the examiner takes official notice. See Office Action, on page 6. Applicants respectfully traverse this rejection.

As indicated by the foregoing, Applicants consider independent claim 15 to define subject matter that is both novel and unobvious over Ueda and Wieserman, either alone or in combination with Obanawa. Claim 22 depends from claim 15 and incorporates all the features of claim 15. As discussed *supra*, all the features of claim 15 are not taught or suggested in the prior art references. Accordingly, on this basis, dependent claim 22 is allowable.

Further, with respect to dependent claim 22, there is no reasonable expectation of success for one of ordinary skill in the art to choose *at least three sulfonic acid groups* as functional groups and attach a spacer between the chelating particles and the chelator compounds by a covalent chemical bond. Applicants' choice of at least three sulfonic acid groups is not common knowledge in the art. While sulfonic acid is known in the art as a chelator (as taught by Obanawa), there is no teaching in the prior art references cited by the Examiner to chose "*at least three sulfonic acid groups*" as functional groups for the chelator compounds. For example, Applicant could have chosen at least *one* or at least *four* sulfonic acid groups, which may function for chelation. However, Applicants' claim recite that *at least three* sulfonic acids provide the unique advantage in providing efficient chelation of metal ions from the substrate surface. See, specification, paragraph [0023]. Such inventive insight is only possible with the

benefit of hindsight provided by Applicants' own disclosure. Accordingly, Applicants submit that dependent claim 22 is allowable and requests withdrawal of this rejection.

F. Conclusion

Since claim 15 defines subject matter that is non-obvious over Ueda, Wieserman, and Obanawa cited in the Office Action and there is no reason to modify any of the references, the obviousness rejections should be withdrawn. Accordingly, Applicants request reconsideration and allowance of independent claim 15 including the claims that depend therefrom, as these dependent claims incorporate all the features of the independent claims.

G. Request for Allowance

In view of the amendments and arguments presented above, all claims are now thought to be in condition for allowance, an indication of which is solicited. In the event that any issues remain outstanding, Applicants would appreciate the courtesy of a telephone call to the undersigned to resolve such issues in an expeditious manner so as to place this application in condition for allowance.

No additional fees are believed necessary. In the event other fees are necessary, the Commissioner is hereby authorized to charge such fees, or credits, to Morgan, Lewis & Bockius Deposit Account no. 50-0310.

Respectfully submitted,

MORGAN LEWIS & BOCKIUS LLP

Date April 23, 2008

By Dejlen (Reg. No. 46,882)
for Laba Kapki, Ph.D. Reg. No. 55,317

Customer No. 09629
1111 Pennsylvania Avenue, N.W.
Washington, D.C. 20004
Phone: (202) 739-3000
Facsimile: (202) 739-3001
Direct: (202) 739-5590